Earth Science

Rockhounds' NATIONAL Magazine

Elaborately Carved Chinese Jade. (See page 197)

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Industrial Techniques Now Offered to Lapidaries and Gem Makers

By **M. F. MACAULAY, President, Bruce Products Corporation**

FOR over forty years, Bruce Products Corporation has furnished industry with buffing, polishing and lapping bars to produce the high lustre polish on such items as automotive bumpers, radiators, lamps, mouldings, etc. Likewise, in the appliance field for toasters, refrigerators, coffee pots, pans, etc.

It was, therefore, reasonable to expect this company, with their well equipped research laboratory, to develop products for the Gem Makers and Lapidaries. This development was the result of over five years' intensive research. They realized that the same materials used in industry would be unsatisfactory in the Gem Maker and Lapidary fields.

It was first necessary that a bond be developed which is water soluble. This insures easy cleaning of the gems without the use of solvents such as Kerosene and Carbon Tetrachloride. Being water soluble, no grease could remain in the crevices of some types of stones and ruin the appearance of the gem.

Next, this bond must act as a lubricant to serve two essential functions. It must hold grit to the wheel and must provide lubrication for lustre. Again, a third problem of finding a suitable bond was to obtain one with a melting point low enough that the heat generated would not stain or crack the gem.

It was necessary to secure and test the finest possible graded grits and to determine the proper ratio of bond and grit to give the best results. The bars must not be too hard nor too soft.

These problems have all been overcome and the products developed are now available to the field. They fill a need long existing for compounds that would facilitate grinding, polishing and buffing as well as facet operations. They bring new ease and simplicity to all these operations.

These products eliminate loose abrasives with all their method faults such as dirt, contamination of grits, slow cutting and poor lustre. There is considerable improvement in lustre due to the lubricant in the bond of these bars.

Greater spindle speed can be used as the bond holds the grit to the wheel. Using slurry, it is safe to say that about 90% is wasted and thrown off the wheel. No longer will you have to put up with slurry all over you and in your hair. No longer will you have to work like the ancients and with those dirty abrasive coated machines.

Using these products, you will find many different abrasives can be used on various gems. Unblended lustres can be obtained. These products will keep your work cooler and will not stain or discolor. They will not irritate the hands.

The products which are now available are as follows:

Bruce Bars for Lapping and Faceting: Silicon Carbide in 100, 220, 400, 600 and 1,000 Grit (all accurately graded for size).

Norbide Bars—next in hardness to diamond: Grits of 180, 400, 600 and 800 (grits cut as high as three times as fast as Silicon Carbide but of course are more expensive).

Bruce Bars for Polishing and Buffing: Tripoli Bars, Tin Oxide, Chrome Oxide, Aluminum Oxide, Bruce "X", Cerium Oxide, Linde "A", Rouge and Jade Grits (blend for Jade)—(others will be produced as the demand develops).

To give greater life to Sanding Belts of Discs, a product, Gem Cool, is offered which keeps the sanding media clean, produces a much greater life and provides faster operation.

For further information, contact your authorized dealer or write the factory, direct, at Howell, Michigan, and we will get you in touch with an authorized dealer.

✧ EARTH SCIENCE ✧

AT THIS EARLY DATE EXTENDS SEASON'S GREETINGS
WISHING ALL OUR READERS

A Very Merry Christmas

May we suggest that you seriously consider presenting an annual (or perhaps a 3-year) subscription to Earth Science to your friends and acquaintances as a 1959 Christmas Gift.

In this way they will be reminded of your friendship six times each year, as each new issue enters their homes. Do not forget your Public and School Libraries. Place the Earth Science Magazine on their reading tables.

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FOR A HAPPY NEW YEAR

By JANE THATCHER

So you're tired of the fracas of the Moot
Courts rivey tenets . . . and you're wishing
For a Cockaigne . . . where the Agates grow
on trees.
With each passing day it's harder to fill
Your empty larder and you're like as not to
Say the things that please.
Yes, there is a King Carnelian Tree in a
Bosky glen somewhere . . . but you haven't
Found it, have you . . . so you say.

I've no magic to astound you . . . my request
Is look around you and listen just a
Moment while I say . . . When this great big
Show is over and you're covered up with
Clover . . . for your act upon the stage of
Life is thru . . . it's too late to start all
Over so why not start today and be kind to
Folks you meet along life's way . . .

For Cockaigne is all around you . . . you who
Search and yearn and pray . . . yes this prize
Is simple for the wise who learn the
Greatest thing is just to love and be loved
In return.

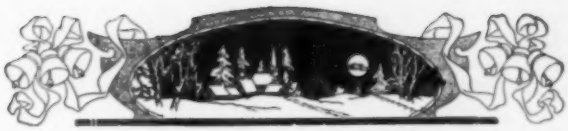
For that's what builds the bridges, writes
The books and rules the world . . . your baby's
Smile and friendship's clasp and your
Nation's Flag unfurled . . . So come back from
Your Shangrila . . . Cockaigne . . . and you
Will find . . . that life is what YOU make it
So be kind . . . be kind . . . be kind.

"ROCKHOUND'S PRAYER"

As we wander over hill and dale
By stream, through rain and snow and hail,
Looking for the precious stone
Perhaps fossil wood or petrified bone,
Let us think of the Maker whose toil
Placed these rocks in the virgin soil.
Were not for him, our hammers rust
No gold to find or geode bust,
Now as the hills and dales we trod
Think of but one, and that is God.

We search our lives for pebbles rare
To stake a claim, who knows where,
Let's give our thanks to Him whose hand
Has built the mountain, sea and land,
For were it not for Him above
Whose creation of earth was done with love,
We would not have our field and stream
To find the things in a rockhound's dream,
So think not of stone as a thing to hoard
But as gifts presented by our Lord.

James P. Eich



Editor's Memo Pad

"FAIR EXCHANGE IS NO ROBBERY." Conversely, perhaps we might say, "Unfair Exchange is Robbery," or something even worse,—but for the present let us continue to do our thinking on the side of our original premise. This matter of exchange as a method or an aid in building up one's personal collection is perfectly legitimate and in our opinion, may we say, is really commendable,—for while we are actually benefiting ourselves, we are at the same time usually helping someone else to improve his collection also.

We interject these thoughts into our Christmas issue, as it is at this time of the year that we are more often, or should be more often thinking of others and the matter of giving,—and making someone else better off or happier thereby, while incidentally at the same time we may become happier ourselves in the satisfaction to be gained by so doing. Try it and be convinced that this is really true.

Every one of us may, no doubt, have many more good duplicate specimens in our collections than we may wish to give 'house room.' These may be of excellent quality, perhaps only slightly inferior to the best in our cases, but which are at present serving no good purpose in our keeping. Possibly we may have had a local monopoly in finding them, or they may have been obtained by our making a lucky strike in some of our travels. They may even have been dumped in our laps by some other person who was likewise fortunate, inherited from some estate, or given to us by someone who may have lost interest in his hobby. Be this as it may, we have them,—they are ours, but, why be a hoarder,—why keep them lying around for years at a time just collecting dust on our shelves?

In ridding ourselves of such surplus specimens, we may have several alternates from which we may choose. Surrounding circumstances, or perhaps sentiment may alter or assist us in making a choice. We will mention just a few of them. First, we might make up small collections or sets for use in elementary schools, in libraries, boy or girl scout troops, or junior mineral club groups, etc., or we might give them outright to some boy or girl who might be interested in starting a collection of their own, which would certainly encourage them greatly. Again we might donate them to our local club or society to be used as a door-prize or place them on the club auction table, thereby aiding in enlarging the club treasury. Last, but not the least of these considerations, we might give them as a present to some good friend, or better still, perhaps exchange them with him thereby improving or enlarging your own collection as well as his, while at the same time it will give him the satisfaction of knowing that he was also able to have helped you in return for your favor.

Here now may we suggest just another simple idea. Many, if not most collectors specialize in some one or more particular field. It may be crystals, fine or rare minerals, metallic ores, semi-precious gemstones, polished specimens, micro-mounts, or what have you. You perhaps already know, or may easily find out just what these specialties are, and then carefully select suitable gift material that will fill some void, or improve a certain niche in the collection which may be missing. For example, do not give a lapidary fan a fossil, he would have no use for it, and might not even care to have it lying around;—but, let us say, present him with an agate, or some other good gem cutting material, that he will really appreciate.

And yet one final suggestion that we feel very much worthwhile. In case you do not have suitable gift material on hand, why not go into the market and buy something needed to fill the bill. Instead of purchasing a neck tie or a hanky, or perhaps a box of cigars or a package or two of cigarettes, things which are either transient or useless, why not spend a like amount of money for a few good mineral specimens or some cutting material, which will certainly be much more appreciated and lasting. There are usually local dealers nearby, or dealers from far away places in attendance at our conventions and shows who are willing and glad to serve you, or who will even go out of their way to look up something you wish. Also refer to the advertisements carried on the pages of your mineral magazines, they are reliable and dependable in every respect. We recommend them highly.

* * * *

Chairman's Message to ESCONI on the 10th Anniversary of Founding

ON this tenth anniversary of "ESCONI" and as its duly elected president, I feel very humble indeed that it falls my lot to write an appropri-

ate message on this momentous occasion. In presenting the following points, I am more or less expressing the thoughts that have run through my mind in my term as president.

Running a club of 525 members is big business. In addition to my office, there are 15 other executive board members, all contributing a great deal of work and time as an outside activity. None of these people presents "bills" for the money spent on phone calls, gasoline for errands, small items to maintain good programs, contributions to the door prizes and donations to the auction. Likewise, these characteristics are typical of our membership.

I have tried to analyze the factors that make for such a wonderful relationship and have wished many times that the professions by which we make our living could be run with the same high standards of business ethics and good conduct as I have experienced with the other board members in running this club.

Is it because these activities are voluntary and carry no thought of making a living? Do we select Earth Science as a means of relaxing our nervous tensions that build up day after day as we strive for positions of power, influence and higher salaries? There is nothing I know of that will better rejuvenate my body and soul than a good exhausting rock hunt or archaeological expedition.

What is it about Esconi that has perpetuated the original ideals of the club and contributed to its fantastic growth year after year?

Because of our accomplishments we enjoy top rating with schools, colleges, libraries, museums, state and national geological institutions, dealers, and our brother and sister clubs. We are friendly and democratic. In this club there is no class distinction between members who perform all kinds of work from the most menial tasks to the so-called highest professions. I hope the time will never come when we become conscious of this so-called hierarchy.

Witness the "Junior Festival" where, after a year of intensive study in Earth Science our 200 enthusiastic young people put on a stupendous program relating to their year's progress.

Not only do we promote Junior activities but also adult education and scientific knowledge. For a club of this size it seems incredible that "Esconi Associates" could enlist enough people to sponsor the publication of that beautifully illustrated LANGFORD book on "The Wilmington Coal Flora."

In this club we have not so far previewed, interviewed or challenged candidates desiring membership. We accept them with the understanding that they already know about our objectives, our ethics and our standards of good behavior.

Wilbur L. Hoff, President

CHICAGOLAND 1959 FIELD TRIP: The Annual Chicagoland Fall Field trip was held on Sunday, September 27th, under the direction of ESCONI (Earth Science Club of Northern Illinois), of Downers Grove. The planning of these Coal Measure "Fern Fossil" collecting trips to the strip mines of the Wilmington-Coal City area, is rotated from year to year between the different affiliated clubs of the Chicago Area. They have been held regularly each year for the past 25 years, and it was on the occasion of one such trip that the Midwest Federation was organized by three Societies, the Joliet Mineralorists, the Marquette Society of Chicago and the Wisconsin Geological Society of Milwaukee in 1941.

Picnic dinners are always held at the employees' recreational center of the Northern Illinois Coal Company, under arrangements made by Melbourne McKee and John McLuckie of Coal City. More than seventy-five cars were counted this year with an estimated attendance of about 300 persons from clubs of Iowa, Wisconsin, Illinois and Indiana. As usual much visiting and swapping was done at the noon hour, at which time Dr. Frank Fleener gave his usual explanation of the area, for the benefit of newcomers, before they scattered out into the stripped area to collect fossils. Some twenty square miles have been stripped during the past thirty years, not all of which, however, contain fossils. They are not as plentiful as in earlier years, but many good ones may still be found by those who search diligently for them.

* * * *

OUR AUTHORS

Earl D. Cornwell, research department of Armour & Company, is an ardent mineral fan who has developed a scientific interest in his hobby far beyond that of the average rockhound. He has written many authoritative articles for EARTH SCIENCE, and his present, "Prospecting for Radium and Thorium," is one which should be of much value to anyone proposing to undertake such an adventure. Earl also is the very efficient Advertising Manager of EARTH SCIENCE.

Frank Moran, who writes on the history of art Jade, is no novice in this field. As statistical consultant with the Western Electric his temperament is satisfied with nothing less than perfection. He is a connoisseur of art Jade, and his library on the subject and personal collection, are, to use a much overworked expression, fabulous. He will visit his daughter who lives in Hong Kong, China soon and we may be certain some of the fine art material in China will take a 'licking' before he returns.

Midwest Club News

Mrs. Bernice Rexin, Club Editor
3934 N. Sherman Blvd.
Milwaukee 16, Wis.

TRI-COUNTY ROCKS AND MINERALS SOCIETY'S first annual show, held at Saginaw, Mich., was a tremendous success. Gem and mineral societies from all over Michigan participated in the event. There were approximately 50 entries and they were of consistently high quality throughout. The trophy for the best club exhibit was won by the Michigan Mineralogical Society and Paul Zammit's beautiful mosaic of a Japanese girl captured the trophy for the best individual exhibit. Nearly 50,000 people from 25 states viewed the sparkling array of gems and minerals. The society will be host to the Midwest Federation's convention in 1961.

ISHPEMING ROCK AND MINERAL CLUB, the Midwest Federation's convention host for 1960, July 1-4, made a late summer trip to Ironwood, Mich., to collect aragonite, manganite, goethite, calcite and needle ore from the mine dumps of the Penokee, Carey and Montreal Mines. The day was climaxed by a visit and trading session with the Range Rock Mineral Club.

MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY recently heard a talk, illustrated with slides on "Caves," by Mr. M. V. Parker. Charles Nash exhibited some fine artifacts and discussed their origin and excavation.

In July the group made a field trip into Alabama. In a limestone quarry at Rockwood some fine oolytic limestone and horn coral were found. At Margerum nice clusters of selenite and a few specimens of honeycomb coral were collected. Quite a few blastoids and one trilobite were also found.

WISCONSIN GEOLOGICAL SOCIETY on Oct. 12 heard a very interesting and educational talk on "Gemology" given by gemologist George Schrank. The lecture centered around gem identification and crystallography. Color slides of crystal structure and inclusions were shown.

DES MOINES LAPIDARY SOCIETY on Sept. 19 held a combined braggin'-rock and ice-cream social meeting. Prizes were given for the best rock collected during the summer and for the best story about finding a braggin' rock. An award was also made for the finest piece of lapidary work displayed that was not made by the exhibitor. Judging was by popular vote.

CHICAGO ROCKS AND MINERALS SOCIETY on Oct. 10 heard Addison Avery, a past president of the society, talk on "Indian Artifacts." The talk was well illustrated with color slides of artifacts and paintings of Indian life by Irving Couse. Mr. Avery was dressed in full Indian costume for the occasion. He exhibited selected items from his collection of over 1600 Indian artifacts from 28 states. He also recommended books to read and places to visit for those who were interested in American archaeology.

MINNESOTA MINERAL CLUB made a field trip to Mahtomedi, Minn., on Sept. 13 where it collected many good agates in a gravel pit. Visitors from as far away as Texas and California participated in the hunt.

CHICAGO LAPIDARY CLUB'S member Earl Christenson gave a talk and demonstration on investment casting by the lost wax process. This process dates back to the ancients. Mr. Christenson concentrated on the modern method, which he uses to make most of his own ring and jewelry mounts.

CENTRAL IOWA MINERAL SOCIETY'S members have donated approximately 500 pounds of rock to the Campfire Girls, Boy Scouts, and YWCA for their lapidary programs. Much of the material was slabbed and most of it was suitable for cabochons. The Boy Scouts plan to make paper weights and pen bases with the petrified wood included in their box.

INDEPENDENCE GEM AND MINERAL SOCIETY reports that specimens of black hematite may be collected in the Iron locality in St. Francois county, Missouri and that geodes with pink calcite crystals are found at Francisville, Mo. IG&MS was scheduled to make a field trip to Avalon, Mo. on Oct. 25 for hematite fossil clams.

KALAMAZOO GEOLOGICAL AND MINERAL SOCIETY on Oct. 5 heard a highly interesting talk given by William Thatcher on "Pre-Historic Copper Mining in Michigan." Mr. Thatcher is a past president of the Grand Rapids Archaeological Society. Member Lester Weiss gave the club an informative talk on "How to Photograph Your Rock Specimens." He explained what lights, measurements and backgrounds to use. He also inspected cameras belonging to the members and told them if they could be adapted to taking pictures of specimens.

(*Continued on next page*)

IMPORTANT ANNOUNCEMENT!!

BEGINNING with our next issue an additional feature covering art in Lapidary work will be included in our magazine. We hope to publicize new ideas in lapidary work and thereby encourage our readers who are interested in this phase of Rockhounding to study new art forms, color and general principles of design.

This feature will be under the direction of two well qualified Midwest artists who have always been helpful wherever problems in art lapidary have arisen. They are Donnafred Hoff, artist, poet and designer of exotic jewelry, who will collaborate with Harold L. McCleery, engineer and inventor by profession but a genuine Rockhound and Lapidary in his leisure moments.

Donnafred who has worked extensively in oils and other media, belongs to several art clubs and societies, and has several one-man shows to her credit, having won numerous prizes with her paintings. She is a regular contributor to the Chicago Tribune's Line-O-Type column and has a published book of poems.

In cooperation with her husband, Dr. Wilbur L. Hoff and son "Rocky," both scientists of note, she has acquired a fantastic collection of fluorescent radio-active green and yellow-vaseline glassware, which has been colored by the use of uranium and other mineral compounds. This collection has been exhibited at numerous shows and two Midwest Conventions and is always the marvel of all privileged to view it.

Mr. McCleery operates his own engineering machine shop and has a REAL Rockhounds basement, equipped to perform anything in the lapidary line more efficiently than it was ever done before. If "Mac" doesn't have a machine to do a special job, he invents one and his only problem seems to be to find a place to exhibit the many beautiful pieces of jewelry he designs and makes during his spare time. We are indeed fortunate to have the assistance of these two very talented people and hope that our lapidary friends will keep them very busy by sending in illustrated articles and ideas in abundance. We firmly believe that there are now thousands of lapidary fans scattered over the country who are ready and will be only too happy to express themselves in new forms of lapidary art and will be glad to avail themselves of this opportunity to do something on a little higher plane of artistry. At the same time we do not intend to neglect the beginners, and will continue to publish more simple lapidary articles for their benefit. W.H.A.

MIDWEST CLUB NEWS *(Continued)*

GRAND RAPIDS MINERAL SOCIETY viewed "A Star is Born" at its Sept. meeting. The movie covers the story of diamonds from rough stone to cut gem. Dr. Richard Rose gave a brief talk on "Setting Up a Collection" with particular emphasis on cataloguing and indexing minerals.

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS participated in the annual Downers Grove Fall Festival on Sept. 5 with exhibits of Hawaiian and Alaskan archaeological specimens; geodes from Hamilton, Ill., Pyrite nodules from Wilmington, Ill., hand made jewelry; and polished slabs. A group of ESCONI experts were on hand with equipment and books to identify minerals and fossils for the public.

NEBRASKA MINERAL AND GEM CLUB was scheduled to hold its second annual Gem & Mineral Show on Sept. 26-27. The club expected to fill 100 display cases with exhibits and had invited the nearby societies to participate. Among the special features planned for the show were a gold-panning booth, a rock-hunting booth with 1000 good specimens buried in coarse gravel, swap tables, and working demonstrations of silver-work and lapidary.

ST. LOUIS GEM AND MINERAL SOCIETY on Oct. 9 heard Mrs. Gladys Babson Hannaford, who is associated with the DeBeers Consolidated Mines, Ltd., speak on "The Mining, Cutting and History of Diamonds." Mrs. Hannaford, a world traveler, is one of the leading authorities on diamonds in the United States.

Items of Interest on Fluorescence!

TWO items, in fact, that have recently come to our attention that we think worth passing on to our readers. First Dr. Wilbur Hoff, president of ESCONI, of Downers Grove, Illinois, has observed that certain antique glass dishes, known as cobalt-blue fluoresced most beautifully under the ultra-violet light and has straightway proceeded to obtain an almost complete dinner set, a part of which was exhibited in the ESCONI cabinet at the Midwest Springfield convention in June, where it created much admiration. He also discovered that a yellow tinted glass, commonly known as vaseline yellow, also fluoresced markedly. Try your ultra-violet light on your old glass dishes—you might perhaps get a pleasant surprise.

The second item comes from Byron Sowers, member of the Mineralorist Society of Joliet, Illinois, who reported that he was surprised to find no fluorescent blues in his otherwise good collection of fluorescent minerals. Later his attention was called to the fact that his eye-glasses were fluorescing blue, and immediately the secret was out. The glasses, perhaps slightly tinted, were acting as a filter, screening out the light rays which he naturally thought to be missing. Other glasses were afterward found which were fluorescing yellow, due no doubt to some mineral element in the glass either therein by accident as an impurity or by design for some real or fancied purpose. Moral —if some of your fluorescent specimens are disappointing, or not living up to their reputation, better look into the matter of your eye-glasses, they may be the culprit.

PHOSPHORESCENT PIGMENTS*

A method for producing phosphorescent pigments from alkaline earth sulphides has been developed. This is stated to have advantages over the usual method which employs a zinc sulphide base in that usual commercially available materials can be used. The following formulas have been offered:

Greenish-blue Phosphorescence. A mixture of 20.7 gms. Strontium Hydrate, 8.0 gms. sulphur, 1.0 gm. lithium sulphate, and 6 cc. of 0.3 per cent aqueous colloidal bismuth is heated in a porcelain crucible for 40 minutes to a point of incandescence. The mass is then allowed to cool slowly.

Red Phosphorescence. 40.0 gms. barium oxide, 9. gms. sulphur, 0.7 gm. lithium phosphate, 3.5 cc. of 0.4 per cent alcoholic copper nitrate. If the lithium phosphate cannot be obtained, it can be replaced by a mixture of magnesium phosphate and sulphate or carbonate of lithium.

Red Phosphorescence. 40.0 gms. magnesium phosphate, 0.7-1.0 gm. lithium sulphate, and 3.5 cc. of 0.4 per cent alcoholic copper nitrate.

*U. S. Industrial Chemical Co., (Phosphorescent Pigments), 60 East 42nd Street, New York, N.Y.

INDIANA GEOLOGY AND GEM SOCIETY'S geology section on Sept. 2 viewed two fine colored films on Paleontology. The first film dealt with the care exercised in collecting fossils and the laboratory methods used in scientific study of the specimens. The second film illustrated various types of fossils, including petrified tracks, burrows, invertebrates, primitive fish, extinct reptiles, and grotesque extinct mammals; and showed the artist's method of reconstructing animals never seen by man. Using "the present key to the past", he studies bones and muscles of modern animals. He then draws in muscles as they must have existed to operate the fossil skeleton. Thus starting with bones, he can often reconstruct the creature, sometimes completely if bits of hair and skin have been preserved.

TOPEKA GEM AND MINERAL SOCIETY recently viewed color slides of minerals used as gems and for ornamental purposes. A discussion on lapidary completed the program.

MICHIGAN MINERALOGICAL SOCIETY on Sept. 14 heard Dr. Willard Parsons, geologist and a recognized authority on volcanology, speak on "Capelinhos Eruption of Fayal Volcano, Azores." He described the entire 13-month eruption which built a new cinder cone out into the ocean on the flank of the old Fayal Volcano. The eruption started in late September of 1957 and lasted through October of 1958. The talk was illustrated with slides, maps and a colored movie of the eruption.

(*Continued on page* 200)

PROSPECTING FOR URANIUM AND THORIUM

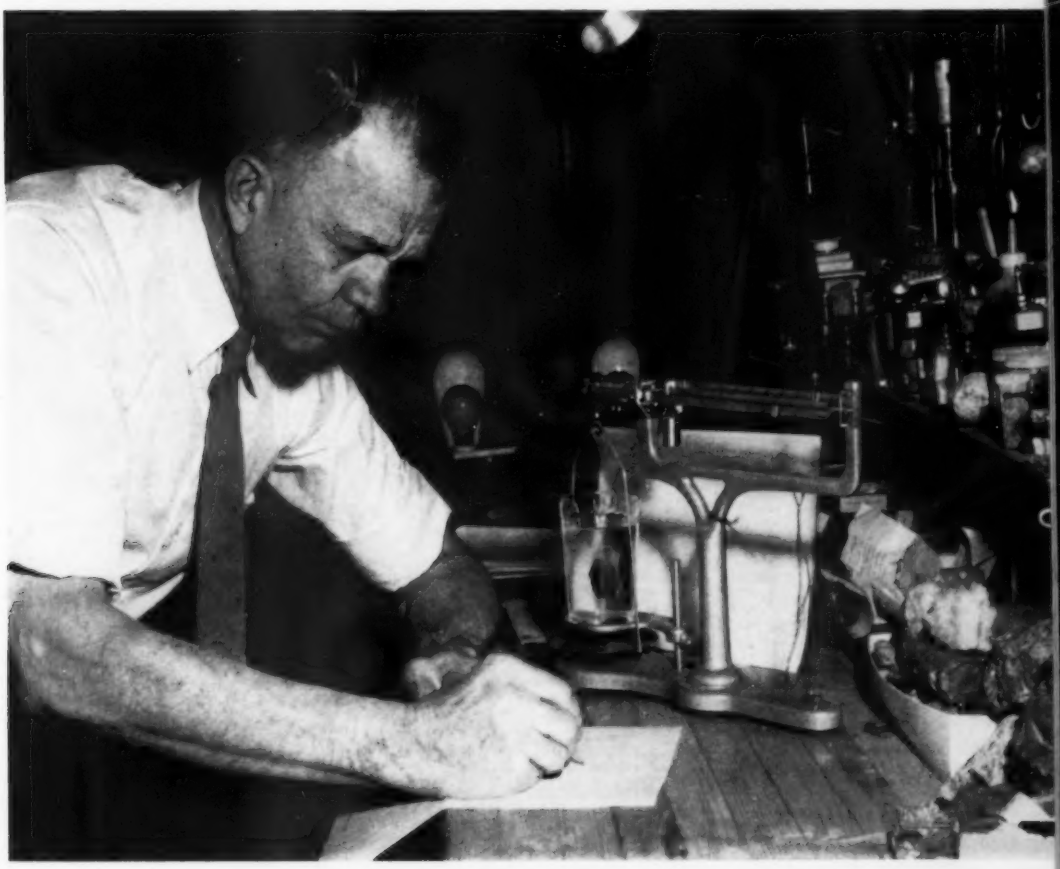
By EARL D. CORNWELL

THE BEGINNER or non-professional prospector of today should waste little time in deciding upon what to look for when he really becomes serious about this subject. The mineral or minerals currently on most everyone's mind, who is dreaming of striking it rich, are undoubtedly uranium and thorium. One reason for this may well be the fact that at the start of 1956, production of uranium in this country was at the rate of 4,000 tons per year, while the production for this past month of November has exceeded 8,000. Recent releases also indicate that by December 31, 1956, Canadian uranium production was at the rate of 3,300 tons per year.

Aside from the personal satisfaction realized in obtaining one's goal should be a greater satisfaction in his contribution to the "Atoms for Peace" program; also, his helping to discover "source materials" so badly needed in the program designed for the benefit of mankind.

Before thinking too seriously about such a program, however, a broad basic knowledge of both uranium and thorium should be obtained. For the beginner, a wide range of references also should be studied; among such references should be:

ROCKS AS CHEMICALS are chief interest of Earl Cornwell as he examines specimens in his basement workroom. Here he tests a rock for its specific gravity and also for mineral content with various chemical reagents.



1. Prospecting for Uranium, by U.S. Atomic Energy Commission and U.S. Geological Survey, 1951.
2. Prospecting with a Geiger Counter, by U. S. Atomic Energy Commission.
3. Contributions to the Geology of Uranium and Thorium, by the U.S. Geological Survey and Atomic Energy Commission for the United Nations International Conference on Peaceful Uses of Atomic Energy, Geneva, Switzerland, 1955; Professional Paper No. 300, 740 pages.
4. Search for Uranium in the United States. Geological Survey Bulletin 1030A.
5. Facts Concerning Uranium Exploration and Production, 1956, 130 pages.
6. Mineral Facts and Problems, Bulletin 556, Bureau of Mines, 1956, 1009 pp.

All above references may be obtained from the Supt. of Documents, Government Printing Office, Washington, D.C.

7. Handbook of Uranium Minerals, by Jack DeMent and H. C. Drake (Mineralogist Publishing Co., Portland 15, Oregon.)
8. A top reference is a New Map by Mc Allister (1955) of the Nine Southwestern States entitled, "Good Prospecting for the Fall and Winter Seasons." The map is complete with trails, and marked with recent Uranium discoveries.
9. U.S. Government Anomaly Maps, by the Atomic Energy Commission showing results of Aerial photographic surveys; they are published monthly.
10. U.S. Geological Survey Topographical Quadrangle Maps, available by states.
11. County Maps are available at most County seats, some having detailed mining district maps which should be consulted.

The foregoing should serve only as a basis for obtaining necessary information and background to be used in preparation for the trip—before leaving.

Necessary personal equipment needed for such an adventure may be listed as follows:

1. A good stout cane for probing about.
2. Canvas bucket for water.
3. Camp stove, "Prepo-gas" recommended.
4. Compass; one for the car and one on the person.
5. Field test kit, portable type.
6. File, or similar objects for testing rock-hardness.
7. Gold pan, for panning.
8. Knife, pocket type.
9. Map-case or port-folio.
10. Prospector's pick, "Estwing" recommended.
11. Ropes, Manila, 100 & 200 feet in lengths.
12. Shovels, picks, pails; assorted sizes.
13. Snake-bite kit, "Standard"
14. Steel-tape, 100-foot length recommended.
15. Tarpaulin, for car & camp.
16. Ultra-violet lamp.
17. Water-cans, about 5 gallons.
18. Sleeping-bag, one for each in the party.
19. State law reference books on minerals.
20. Spare tires, at least two; also, other parts.
21. Additional oil & gasoline.
22. Necessary tools for work on car.
23. Flashlight
24. Lantern
25. Telescope
26. Watch
27. Magnifying Glass
28. Magnet
29. Tent
30. Wire

The foregoing may serve to represent bare necessities from the standpoint of physical equipment. A similar list for necessary Supplies would be equally as long.

No doubt, the most practical type of

Mr. and Mrs. Earl Cornwell examine minerals from their collection.

transportation to use is a jeep, the size of which will govern, to a degree, the amount of Equipment & Supplies to be taken.

After completing plans for equipment, supplies, and type of transportation, and having studied over government maps showing location of current mines and areas already covered by claims, the next step would be to decide how the preliminary survey or reconnaissance should be made for the entire general region or locality under consideration. So long as the whole venture is more or less a gamble, I would prefer to consider some area such as the comparatively recent restoration at Pumpkin Buttes, Wyoming, near Casper, rather than try to find an unclaimed area in such an active zone as the Colorado Plateau. Providing this area did not prove-out, a second choice would be New Mexico, since the newly declassified figures released show that this state is now by far the richest in the U.S. in uranium. A recent strike at Grants revealed an ore-body 800′ x 1000′ and 30′ thick of uranophane.

The first choice for screening such an area would be by the use of an aeroplane and a supersensitive Scintillometer, fitted with a tape-recorder. The next best would be to obtain a series of the Aerial photomaps of the region, if available. After the decision has been made as to the particular area to be concentrated upon, the next logical step would be that of investigating the ownership of the particular area and above all, obtain the owner's permission before setting foot upon the place. This is one of the "musts" in prospecting. Under no circumstances should one venture to trespass on private property while prospecting. In many cases, such action is actually dangerous and does not warrant taking the chances. One should be constantly on the look-out for

signs of "locations" or "monuments" of other prospectors. If, in any case, one is told to get off the property, do just that.

After proper permission has been granted, and it is advisable to carry such a permit on one's person, the big job is then to prepare and follow a logical pattern or procedure of prospecting. It is well to mark one's trail wherever possible so as to be able to find the way back to the starting point. It is also recommended that a person attempt no such trips alone. The minimum number in the party should be three, one remaining at the cabin or headquarters.

Among other equipment in addition to that previously listed, one should have a good Geiger Counter and an Ultraviolet lamp. The former is used in locating the primary uranium and/or thorium ore-deposits while the latter is used for the location of secondary minerals. Primary uraninites, such as pitchblende, do not fluoresce.

Points to be observed while using a fluorescent light may be listed as follows:

1. A number of secondary uranium bearing minerals are highly fluorescent, i.e., those which contain the "uranyl" group.
2. In practically every case of fluorescence, the characteristic yellow-green or some hue thereof is observed.
3. Generally, the more soluble uraniferous minerals are listed among those which fluoresce.
4. The largest number of fluorescent uranium minerals are those which have a specific gravity of approximately 3.5. Few such minerals with a high sp. gr. fluoresce.
5. Fluorescence is best excited by short-wave-length ultraviolet radiation, e.g., wavelengths of 2537 A.U.
6. Primary uraninites, after weathering, frequently alter to secondary types and thus become fluorescent species. As a result, it may be possible in some cases to make a dual detection with a lamp.
7. The presence of uranium invariably presupposes the presence of radium.

As for the Geiger Counter, the following general observations should be looked upon as precautionary warnings:

1. Like any extremely sensitive instrument, the Geiger Counter must be handled with great care. Contaminations must be strictly avoided if reliable and uniform results are to be expected.
2. An electric storm may discharge a counter-tube and thus produce considerable recordings in the amplifying system,. Hence, it is recommended that the instrument not be used while a thunder storm is in the vicinity.
3. Extra precaution should be taken to keep the counter dry at all times. Most field units have a 500-volt circuit, sometimes higher, and as a result, short circuits can damage the counter as well as cause severe shock to the operator.
4. The background counter may be thrown off by shielding of cosmic rays; a high building, a thick forest, or a steep cliff may be responsible.
5. Radioactive dust should be carefully avoided. A small amount which may have accumulated within the case will seriously affect the background count, or may seriously impair the sensitivity of the counter for gamma rays.
6. The Geiger Counter should not be taken near a plant or mining operation where radioactive materials are being crushed or treated.
7. Likewise, the instrument should not be taken underground where radioactive minerals are being mined.
8. An operator should keep his clothing, especially his boots, free from stray radioactive dust.
9. When not in use, or during transportation, the Geiger Counter should be provided with a strong, well-

(*Continued on page* 203)

1959 Convention of the American Federation

HAZEN T. PERRY

Perhaps our good friend and fellow rockhound, Hazen T. Perry, past president of the American Federation, could best be described by that old fashioned, much overworked expression—he is both a "Gentleman and a Scholar," but in modern vernacular, all will agree that he is a swell guy and a good scout. Always kindly, gentle and so willing to help others that he is greatly admired by everyone who knows him.

During his term of office as president of the American Federation, at great personal expense, and sometimes inconvenience, he took pains to visit each of the six Regional Conventions held in the four corners of the country, always boosting the "American" and spreading the gospel of genuine Rockhounding wherever he went. As a result greater progress was made in the affairs of the Federation, than in any other year of its history. Mr. Perry resides in Minneapolis, Minnesota.

AFFILIATED member clubs of the Northwest Federation of Mineralogical Societies were hosts to the American Federation over the Labor Day week end, Portland, Oregon being the Convention city. The host Society, Helen Rice, General Chairman, and her numerous committees deserve real commendation for the outstanding job they did.

"To those of you who were unable to attend," writes Henry B. Graves, retiring Secretary, "I would like to report that the show was really terrific. It was certainly the best by far that I have ever been privileged to attend."

"A capacity crowd was on hand from the opening of the first day until the closing on the last, and the estimated attendance was in excess of 25,000, including about 1,500 registered guests. The exhibits were superb, and the dealers were happy, many of them being practically sold out before the close of the show."

The Midwest Federation is particularly proud of the fact that one of its Past Presidents, Hazen T. Perry, of Minneapolis, a member of the Geological Society of Minnesota, was President of the "American" this year. He presided over the meetings and other deliberations of the Federation at its annual business session, and all will agree that under his efficient leadership great strides have been made in the affairs of the Federation during his term of office.

Numerous reports of Standing Committees were made, the outstanding being the report of Veryle Carnahan, of Whittier, California, Chairman of the Junior Activity Committee. Mimeographed copies of this very comprehensive report have been made and will be mailed to each local affiliated Society of all the Federations. This report should prove to be very useful to all working with Junior Sections.

An excellent program of speakers was provided, and the field trips were planned and worked out with unusual care. One of the outstanding events for all "out of state" delegates and American Federation officers was on Sunday morning when Helen Rice and her genial husband entertained at a "coffee and do-nuts" gathering at their truly beautiful estate outside Portland. At least a hundred persons took advantage of this opportunity to view their tremendous collection of gems and minerals so splendidly displayed in their basement hobby museum. It was a real example of Western hospitality, and was greatly appreciated by all who were present.

The usual National Trophies were awarded, and the Junior Essay Contest was of special interest, being awarded to 12 year old Dennis Koza of St. Paul, Minnesota. There were 58 entries in the contest, a $100.00 U. S. Government Bond being the first prize.*

The California Regional Federation will be host to the American Federation in 1960, the Convention to be held at Eureka, California.

*WINNERS OF 1959 A.F.M.S. TROPHIES

(*See page* 200)

AMERICAN FEDERATION OFFICERS
1959-1960

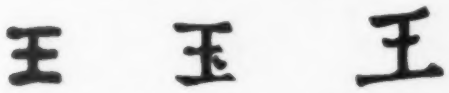
Helen M. Rice, President	Hillsboro, Oregon
Henry B. Graves, Vice President	Miami, Florida
Russell Trapnell, Secretary	Phoenix, Arizona
H. R. Hughes, Treasurer	McAllen, Texas
Ben Hur Wilson, Historian	Joliet, Illinois

Regional Vice Presidents:

Alden Clark	San Francisco, California
Wm. deNeiu	Minneapolis, Minnesota

The Materials of Chinese Jade

By FRANK MORAN



Three ways of writing Chinese word for jade. Character is said to represent three pieces of jade on a string.

JADE has different meanings for the Chinese and for the English. The English define jade as a tough compact gem stone, commonly green, capable of a high polish, and cut from either of two minerals which are jadeite or "true jade" and nephrite. The Chinese usually define jade, or their word yii, as a valuable stone fashioned by lapidaries. Ancient writings applied this word to other than very valuable materials. Among the architectural features of a luxurious house built by the Emperor Ch'eng (32-7 B.C.) are "steps of white yii" which undoubtedly refers to white marble. References to "gold and jade" or "copper and jade" in old books indicate that the word yii was also associated with metallic ores. This use is found in one book listing localities where yii is found. Yii, as the fairest of stones, is also used to convey ideas of nobility, beauty and purity. A pure heart is a jade heart and the gracious speech of the emperor is jade talk. This use is equivalent to the use of "golden" in English. A golden voiced tenor has no relation to gold metal.

In modern Chinese writing the word yii is still used somewhat loosely and ambiguously. The context must be considered if a precise meaning is to be determined. The word, however, is usually used to signify a scarce and costly stone, fashioned by lapidaries into ritual objects and small articles of personal adornment and equipment.

Among the materials used by the Chinese, nephrite, one of jades of the English definition, was highly prized, but many other stones of different colors, patterns and textures were used and were close to nephrite in popularity and esteem. Among these were many members of the quartz group—aventurine, rock crystal, amethyst, agate, chrysoprase and the chalcedonies. Lapis lazuli, coral, amber were also used.

Mention should be made, too, of the so called "false jades" or "soft jades." These are the materials which are sometimes confused with nephrite and jadeite. The serpentines—especially a dark green variety of bowenite from Liao-ning province Manchuria—are used. This last is known as "Mukden" jade. Then there are the still softer stones, pyrophyllite, an aluminum silicate and the steatites or soapstones which are magnesium silicates. These are known "Soo Chow" or "Su Chou" jade and are used to ornament the teakwood boxes and trays so often found in Chinese curio and souvenir shops in this country. These "jades" are soft, can easily be scratched with a knife, have a waxy or greasy feel, and usually are creamy color with sometimes a greenish cast.

An ancient Chinese dictionary from the second century A.D. lists one-hundred and twenty-six characters including the determinative yii. Many of these characters are said to mean varieties of jade or stone used. This Chinese usage is quite different from the English definition of jade which limits jade to nephrite and jadeite materials, to the gem quality of these materials, and, commonly, to the green colored nephrite and jadeite. Actu-

ally, jadeite the "true jade" of the English definition was not generally in use in China until after 1700 when the jadeite mines in Burma (Yun-nan) became a source for the Chinese. An interesting statement about jadeite was made in a book of reminiscences published by Chi Yun about 1800. Chi Yun was a well known scholar and statesman of this period who was born in 1724. He wrote, "I recollect that, when I was young the jade of Yun-nan (Burma) was not regarded as jade but merely as usurping the name of jade. Now it is regarded as a rare luxury, its price far exceeding that of real jade." How times change!

In English, jade has become associated with the color green. So much so, that "jade green" is a separate color. Actually, both nephrite and jadeite are white in their pure state. The pure limpid, white jades are highly esteemed and have been called "mountain jades" because of their resemblance to snow covered mountains. At one time a scale of whites comprising nine different whites was used in this country in evaluating white jades. Besides white, nephrite has a great range of shades in green, blue, mauve, brown, yellow, red, grey and black. Mainly, the coloring agents are compounds of iron. In jadeite, the brilliant emerald green colored stones are highly prized and the color is due to inclusion of chromium. This is the gem quality of jade and is sometimes called "apple green" jade and also "Imperial" jade since the Chinese Emperors reserved the use of the best of this jadeite for his household. Jadeite also exhibits a mauve and a light blue color. Furthermore, some boulders and pebbles found in streams have a brilliant tomato red shade in the outer portion. All of these brilliant colorings are peculiar to jadeite.

The variety of colors and the depth of these colors in translucent jadeite and nephrite is best appreciated by looking at actual pieces. The Chicago Natural History Museum has one case in the jade room with modern carved pieces which gives some indication of the different colors of jade.

The ancient Chinese jades, those carved before 1700, and the more valuable ones, were usually nephrite. These pieces have a soft, damp polish and some of these pieces were considered inferior since the jade was too "dry." Nephrite is composed of a closely felted mass of short, fine fibres and cannot be given a mirror finish. Jadeite, on the other hand, is composed of small grains instead of short interlocked fibres and jadeite can be given a high, vitreous, glassy finish. This contributes to the gem quality of jadeite.

The main and perhaps the only source of nephrite for ancient Chinese jades was Khotan and Yarkand in Chinese Turkestan. Trade in nephrite from this area is known with certainty to have been carried on for more than two thousand years. Marco Polo passed thru Khotan in 1272 and mentioned the finding of "chalcedonies and jaspers" and how "they are carried into Cathay, where they fetch great prices." He apparently did not know the nature of jade and identified it with other stones familiar to him. Khotan and Yarkand are almost directly north of New Delhi, India and are on the other side of the Himalaya Mountains and at the foot of the western Kunlun Mountains.

A modern source for a peculiar nephrite is Siberia. This is a green stone with little black flecks of graphite. The small specks provide an interesting pattern and are considered characteristic of Siberian nephrite. The Chinese call this material "spinach jade" but no old carvings of this material are known and probably it was not used in China before 1800.

Almost everyone who becomes interested in jade sooner or later runs across pieces of "Peking jade." This is one name for glass imitations of jade. Other names especially those used by a collector who pays jade prices for glass are not so complimentary.

I was lucky on my first piece of Peking jade and got my money back. The auction house catalogued the piece as jade and

finally agreed this was an error even tho an expert from New York had classified and appraised all of the jade pieces prior to the auction. Some of the imitations are remarkable, and Peking jade necklaces are often sold to unsuspecting tourists in the Orient. The second piece of "Peking jade" was just such a necklace of graduated beads complete with black flecks and a medium green color to imitate Siberian jade. Fortunately, a costume jewelry price had been paid for it.

From glass to gem quality green jadeite is a wide range of materials. The use of many and varied materials could be expected in an old art and the art of Chinese jade carving is an old and much practiced art.

OUR COVER PHOTO

A PIECE of Chinese jade is the cover picture for this issue. The piece is a "pi" with two hydrae or dragons. A "pi", according to the Erhya, the Ancient Chinese Dictionary (second or first century B.C.), is a perforated disc with the width of disc being twice that of the hole. A later dictionary of second century A.D. defines a "pi" as a ritual jade of a circular shape. Objects of this form have been used since antiquity as symbols of "Heaven" and in the worship of Heaven. Ancient rulers of China ruled as the Son of Heaven. Imperial worship at the Altar of Heaven required the use of a "pi" up until the end of the Manchu Dynasty in 1909.

Altho the form of the "pi" is regarded as most sacred and venerable, the form has also been used as basis for decorative design and for ornamental purposes throughout the history of China. In this respect it is similar to the use of the cross form in Christendom.

Many "pi" jade pieces have dragons carved in low relief on the surface of the "pi". The use of dragons does not have much meaning until its symbolism is understood. According to the Old Chinese Dictionary, a "lung" was a piece of jade carved into a dragon and formerly used in prayers for rain. The Book of Changes says that "Clouds come with dragons," and that, "The flight of dragons in the firmament shows the power of the Creator." The joining of the symbol for the heavens with the symbol for clouds and rain seems natural.

The piece pictured is elaborately carved and finished and is about three inches in diameter. The hydrae are draped over the edge of the pi and are carved solid rather than in relief. This kind of high style and the use of ancient forms and symbols is typical of the Ch'ien Lung period (1735-1796) and the piece is probably of this period.

Picture Gale G. Law and explanation through courtesy of the author, Frank Moran, Downers Grove, Ill.

* * * *

LOOKING AHEAD: In our next issue (February) there will be found many interesting and informative articles on a great variety of subjects. Among them will be a very timely article on the construction and operation of a "Well Water Seismometer," a unique instrument for recording and measuring Earthquake Waves, described by its inventor, Elmer E. Rexin, the husband of Bernice Rexin who is the very efficient Secretary of the Midwest Federation, as well as the Club Editor of Earth Science. The article will be nicely illustrated by Earthquake Logs and photographs.

Wm. H. deNeui, in an article on "Etching Polished Mineral Surfaces" will also describe not only the technique for performing this very delicate operation, but the construction of the apparatus necessary to perform this task, as well. Those who have had the privilege of seeing examples of de Neui's artistic work in this field will welcome this opportunity of getting in on the "know-how." The article will be illustrated by diagrams showing the details of construction.

* * * *

OUR AUTHORS

Joe Phetteplace, master inlay craftsman of Wauzeka, Wisconsin, where he operates a shop and museum, has unburdened himself of many hints which will be very helpful to polishers and collectors, which we are sure they will appreciate very much. He will be best remembered as the artist who made those superb mosaics, "Man O'War" and the "Century of Progress Exposition" which have been widely exhibited throughout the country.

Practical Lapidary Hints

By JOE PHETTEPLACE

WHAT is the object of cutting and polishing an unusual piece of stone? Is it not to bring out some hidden beauty within the stone itself—usually for personal adornment? Minerals, especially many of the semi-precious gem stones, are often like some people,—on the surface they may appear to be very ordinary or commonplace, but when we get better acquainted with them we happily find that inside, their 'hearts are pure gold,' and their character to be a thing of real beauty.

Many beginners and even some advanced cutters do not understand or take advantage of the natural laws, or properties inherent in the stone itself, and therefore often fail to get the most out of it. We will endeavor here to give a few pointers, which personally we have come to learn the hard way, that we hope may be helpful to others who are endeavoring to get as much out of the stone and their efforts as is possible.

First Example:

Not too long ago a man complained to me that he had spent a considerable sum of money for a Turitella Agate, and had sawed up a number of pieces, and didn't get a decent stone out of any that he had sawed. When he showed me a piece I explained to him that he was sawing it wrong, as nature had laid all the little snail shells down in layers and that he must saw parallel to these layers, not across them. In this manner he would get more attractive longitudinal sections of the shells showing their beautiful spiral arrangement, rather than the round sections which are much less attractive, as they would appear in the cross section. In this case a little study or thought before undertaking to cut would have proved advantageous.

Second example:

A common mistake made by most people who cut Lake Superior Agates. A Lake Superior Agate is very fine lined or banded and usually the bands are curved producing an inward stress which is relieved when you saw it into slabs. These slabs will invariably (if fine banded) show small cracks, one to three days after they have been slabbed; they are undoubtedly due to the releasing of the stress inside the stone. I always slab 'Lake Superior' at least three days before I wish to cut and polish a gem stone of this type; then you can cut out pieces in between the cracks without fear of having a cracked stone after it is finished. I have seen stones which were slabbed and cut and polished in one day free of all flaws develop cracks or flaws a day later or over night, which made them practically worthless.

Third example:

Operating a Museum as we do, we meet many people in a year's time who are just beginning to cut and polish stones who seem to fail to realize that Nature gave us an abundance of water, and yet very little is said in our books on cutting stones, that the stone and your hands must be washed between each operation when working with a gem. A man came to our place a couple years ago and showed me about two hundred cut stones but not a stone had a polish any better than about a two hundred grit sander would bring out. I spent about an hour with this man before I discovered that he did not know that he had to wash his hands and stone between each operation. He now runs an agate shop and does a very commendable job cutting stones.

Suggestions for Collectors:

Nature was very liberal with those of us who live near the great Mississippi River Valley, as we can go there to hunt for Lake Superior Agates from Missouri to as far north as Canada. Why people will go out and look for only "Superior Agates" in it, however, is more than I can understand. My wife and I have found the following other stones;—fragments of Bloodstone and Amethyst, Plasma, Montana Agates, Curly Jasper, Brecciated Jasper, Red, Yellow and Brown Jasper plus golden colored Chalcedony and a white Chalcedony with white, red and yellow quartz sand embedded. We have not recently hunted agate in this area as they are pumping up gravel from about sixty feet depth, so there are few agates in the stock piles. We have also found a jet black glassy looking rock with gold flecks in it, which looks interesting to cut. There are other cutting materials in this area which have a nice pattern and takes a fine glossy polish, such as white, cream colored flints with brown and black lines and swirls.

On finding picture Agates:

Methods of finding pictures in gem material vary with each individual who hunts for this material. The first piece of equipment that one needs is a template or card board with holes in it the size that you might want your finished stone to look like. Now take each slab up and any pattern that looks good look at it through the hole in the cardboard; quite often by blocking out the rest of the stone you will find a pattern or picture that you enjoy in a stone. If it is a Montana Agate or any translucent stone hold it in front of a light and new beauty sometimes can be found which will make a transparency. Petrified wood, jaspers and Montana agates and plume or lace agate seem to be the best material that we have found for pictures.

In our collection of pictures in gem-

"Sepulchre of Jesus' Tomb"
A hauntingly beautiful image in stone, all in subdued colors in one complete piece of jasper.

stones we have the seven scenic agatized wood pictures that belonged to the late Joe Sweet of Flagstaff, Arizona. These were quite famous in their day and still are the best we have ever seen of this material. We have seventeen Jasper pictures including the two which are shown with this article; numerous Montana pictured agates and Oregon pictured wood plus about ten fluorescent rocks with pictures in them, a squirrel in native copper and a deer head in Coral. Look closely at each piece of material you find or purchase, you may have a picture.

"Rocket to the Moon."
The 'rocket' is a deep maroon color with luminescent clouds around it, with additional shadings of maroon and cream color.

How to hunt Agates:

How to hunt agates should be of interest to most people, if you haven't developed your own method try this one. When I was in high school I used to go out with my dad hunting "ginseng", this is a plant that grows out in the woods among about a hundred other plants. Now many of these plants look like ginseng and it was a hard plant to find. My dad always found the first plant and would hand me one and tell me to look at it as I walked along so I would get it focused in my mind; soon I would be able to find the plants, it took about two years before I didn't need a plant to start me out. In hunting agates the beginner would do well to have two or three agates to look at when he first gets to the gravel pit, then your mind will concentrate on only this type of rock and you can spot them easier and your bag of agates will have many more than if you do not use any method.

Agates in the Mississippi Valley are usually found more plentiful in the top seventeen feet of gravel which contains a great many dark colored rocks. As the rock is brought up from a lower depth than this the stock pile will contain a large percentage of white rock, move on if the pile of rock is too white as there are very few agates here. The gravel pits are not the only place to look for agates in the Mississippi Valley, as you drive along the road and see a small dry creek bed crossing the flat land in the valley, look the gravel over carefully and you may find some nice large agates in these dry washes, as each storm digs the ditches deeper. A great many of the fields in the Mississippi Valley that are farmed have agates on the top of the ground, but first ask the farmer's permission to look.

* * * *

"15th CHICAGO INTERNATIONAL EXHIBITION OF NATURE PHOTOGRAPHY," co-sponsor Nature Camera Club of Chicago and Chicago Natural History Museum. Deadline: January 18, 1960. Exhibit: February 5-26, 1960. Silver medals and ribbon awards. Entry forms from Mr. H. J. Johnson, 2134 W. Concord Place, Chicago 47, Illinois.

TROPHY AWARDS AMERICAN FEDERATION

BARCLAY Trophy for Fossils,
Michael D. Brown, Portland, Oregon
BARCLAY JUNIOR Trophy for Fossils,
Larry Olson, Hampton, Virginia
BITTNER Plaque for Thumbnails,
Eula and Johnnie Short, San Bernardino, Calif.
BITTNER JUNIOR Plaque for Thumbnails,
Chippy Clark, Newport News, Virginia
*CHROMY Trophy for Micromounts,
Jo and Frank Zimmerman, Payette, Idaho
*GRAVES Plaque for Facet Stones,
Elwood T. Rees, M.D., Twin Falls, Idaho
*GRAVES JUNIOR Plaque for Facet Stones,
Randall K. Stockton
PARCER Trophy for Lapidary,
Mrs. Olive M. Colhour, Seattle, Washington
WOODRUFF Trophy for Minerals
Percy G. Hollister, Eureka, California

*This trophy is perpetual but is the winner's to keep.

RECOMMENDED READINGS

"Synthetic Gem Stones Meet New Resistance in Latest Push for Sales," reprinted with permission from *Chemical Week*, October issue of *Template*. Includes informative discussions on Chatham emeralds and rubies, Linde's star rubies and sapphires, National Lead's rutile and "falulite", and General Electric's man-made diamonds.

"Survival," by A. B. McAntire. August issue of the *Voice*. Survival tips for rockhounds who plan on trips into the desert by an experienced desert traveler.

GUIDE BOOK TO MINERALS OF ILLINOIS: Educational Series 5. Illinois State Geological survey (Urbana, Illinois), 25c Postpaid. Forty pages of highly instructive readable material covering a wide variety of minera'ls found in the State of Illinois, nicely illustrated with pictures, drawings and diagrams. This is a valuable reference which should be on the desk of all rockhounds whether they live in Illinois or elsewhere.

* * * *

EARTH SCIENCE FIELD TRIPS: For teachers, students and amateur collectors. As an Educational Extention Service of the Illinois State Geological Survey, these well planned one-day trips always high-light one or more of the outstanding geological features of the area visited, and are well attended by Rockhound enthusiasts. They are held monthly, in season, throughout the State of Illinois, and a folder giving dates, places and features to be visited may be had upon request, by writing the survey offices at Urbana, Illinois. We recommend them most heartily.

BOOK REVIEWS

THE STORY OF EARTH SCIENCE. Dr. Horace G. Richards, Associate Curator of Geology at the Academy of Natural Sciences and Lecturer, University of Pennsylvania. J. B. Lippincott Co. 1959. 169 pp. $3.75.

Dr. Richards has written this book for the reader who has graduated from beginners' books on earth science but is not ready for the advanced texts. His scope is wide, i.e., rocks, minerals, and fossils. Highlights to this reviewer are the discussion of changing shore lines and the chapter on fossil invertebrates.

The dedication "To those young American Scientists who have brought interesting specimens to me for identification" sets the tone of the book. For Dr. Richards is not merely a purveyor of mineralogical and paleontological data; he is a humanist and something of a philosopher. There is good advice in his book on collecting specimens and joining earth science clubs. Although he has been summoned many times to look at what were fondly believed to be dinosaur bones but turned out to be horse teeth, he still retains his zest for and confidence in new discoveries.

After reviewing with Dr. Richards the history of the uplifting of our mountains and invasion of the continental seas, who can disagree with him that great changes are again in store for the earth? Will man become extinct like the trilobites and the dinosaurs? By asking the question, Dr. Richards gently concedes the possibility.

The black and white illustrations are adequate. Some color photographs would have enlivened the minerals section.

ALL ABOUT THE ICE AGE. Patricia Lauber. Random House. 1959. 153 pp. $1.95.

The Ice Age seems more real to us now that radiocarbon dating has set the melting of the last ice sheet at only around 11,000 years ago. It's a chilling thought that all life and vegetation in much of what is now our country was suspended for hundreds of years while it lay under the crushing weight of the glaciers from the frozen north. And more chilling to think that the future may quite possibly bring another invasion.

ICE AGE is a worthy addition to the Allabout Series. The writing is simple but the book is not superficial. The origin of the glaciers, the observations and theories of Agassiz and other scientists, and the consequences of the prese[illegible]ming trend in our climate are discusse[illegible]debted to Miss Lauber for labeli[illegible]nd hypotheses as such, leaving conclusions to future developments in research in this interesting field.

Twelve striking photographs of glaciers plus numerous illustrations add to the enjoyment of this book.

ANGLO-AMERICA, A REGIONAL GEOGRAPHY. Earl B. Shaw. John Wiley & Sons, Inc. 1959. 480 pp.

Profesor Shaw is in the Department of Geography, State Teachers College, Worcester, Mass. His book was written primarily for college students of geography. Questions, exercises, and suggestions for further reading follow each chapter.

The author has some time-tested theories on the teaching of regional geography. One is to start with a simple region with definite boundaries and general economic uniformity, and then proceed to more complex regions. In the present volume he chose to start with Greenland. He sees advantages, moreover, in considering regional boundaries, although these are subject to change, as well as regional cores.

A generous number of photographs, maps and graphs accompany the text material. A stunning relief map of North America is background for the book's cover. Each of the 14 chapters describe one region of North America from the tundras of Canada and Alaska to the deep South. North America: Overview and North America: Outlook complete the book.

The relation of geographic features to the rise of our large cities is well pointed out and illustrated. Regional differences due to land forms, climate, vegetation, etc. will persist in North America, in the opinion of Professor Shaw, but due to the improvement and greater use of transport, differences in customs, habits and living standards are now minor.

AMERICA'S WONDERLANDS. The National Geographic Society. 1959. 509 pp. $11.50.

For anyone who has visited one or more of our national parks or monuments, this book will recall the beauty and strangeness he saw there. For others, we prophesy it will create a desire to visit them, not to be denied longer than the next vacation.

The Society rightly depends on colored photographs, about 400 of them, to depict the grandeur of the parks. They are next best to viewing with one's own eyes. Some breathtaking aerial shots are included.

The book is divided into seven sections under each of which 5 to 24 parks or monuments are described: Rocky Mountains, Great Plateau,

Southwest, Golden West, Pacific Northwest, East, and Alaska, Hawaii, and Virgin Islands. The text was written by the staff of the Geographic and others in the easy style familiar to Geographic readers. We found the chapters on Chaco Canyon and Everglades particularly interesting.

An introduction by Conrad L. Wirth, Director of U.S. National Park Service, gives the history of the Park System, conceived back in 1870 by a group of far-sighted men around a camp fire in Yellowstone.

Tips on travel, an index, and a map of the United States and Southern Canada on which national parks and monuments are shown are useful adjuncts to a truly glamorous volume.

CONSERVATION OF NATURAL RESOURCES. Edited by Profesor Guy-Harold Smith, Ohio State University. 2nd ed. 1958. John Wiley & Sons, Inc. 474 pp. $8.50.

"What is needed is an enthusiasm and an understanding of the essential nature of resources and the measures necessary to save from wasteful destruction our national heritage."

To stimulate this enthusiasm and understanding Profesor Smith has compiled the contributions of 19 competent specialists into a well-organized volume. The 8 sections are devoted to the development and economics of conservation, soil, forests, water, mineral resources and mineral fuels, wildlife, man and recreational resources, and planning for conservation.

Those of us who like to keep warm will be interested in the section on Mineral Fuels, written by Dr. E. Willard Miller of Pennsylvania State University. It is well illustrated with graphs. Our petroleum supply will be depleted relatively soon, thinks Professor Miller, then we will fall back on coal plus our new resource, atomic energy.

Man, for whom our natural resources should be conserved, is himself a subject for conservation, according to Professor Lawrence A. Hoffman, Ohio State University. The fact that few of our very fertile families are among the wealthy or culturally most advanced segments of our population is not a valid reason for fearing "genetic erosion," says this author, because every newborn child receives a unique pattern of genes, no matter what his parentage. Examples of human conservation endorsed by him are more diligent identification and encouragement of the brightest youngsters and putting the potentialities of our older people to greater use.

(*Continued on page 204*)

(*Continued from page 192*)

padded metal or wooden box. All spare parts should be carried in a separate box when long trips are being made.

10. When samples of radioactive ores are being carried, they must be kept a safe distance from the instrument.

When attempting to evaluate ores, it is recommended that the operator obtain samples of pure uranium compounds, and samples of pitchblende or carnotite should also be obtained, to be used as standards for comparisons with the unknowns.

For those acustomed to making analytical chemical tests, it is recommended that the standard "bead-test" also be used for confirmation. This test is described in detail in a text of Orsino C. Smith entitled, "Identification and Qualitative Chemical Analyses of Minerals."

With reasonable practice, the operator should be in a position to evaluate his own ores to a fair degree of accuracy.

A worthwhile tip for the beginner when starting to scan an area for the first time is to know that radioactive minerals are commonly associated with a number of more common minerals such as:

Bismuth, Cobalt, Copper, Gold, Lead, Nickel, Silver, Vanadium, and Zinc.

As result, all abandoned mines in the area should be screened thoroughly, as the dumps may be a good source of the coveted uranium or even veins or areas underground. Great care should be exercised, however, in entering the shafts of any such mines, due to possible rotten timbers, poison gases, etc.

If there are no such abandoned mines in the area, then the prospector should concentrate on regions that have geological formations and conditions similar to those previously discussed, sedimentary in nature, where uranium has actually been found, rather than screen every square foot of the area, disregarding its geology.

Other factors that should not be overlooked in prospecting along the ground surface may be listed as follows:

1. Observation of "faults" and "fractures" in the mountainous or volcanic areas where lode-deposits of metallic minerals usually occur. Such areas may indicate further values to be found below the surface.
2. The occurrence of outcrops along the surface may also lead to worthwhile, below-the-surface valuable deposits.
3. The finding of radioactive "fragments" which may have weathered away from the source may lead to valuable finds, if time is taken to to trace the source of such "float" materials.
4. Placer deposits should be thoroughly investigated, wherever found.

When any of the foregoing tips lead to a valuable find which may go underground, the method of further recovery then reverts itself to "shaft," "tunnel," "drift," and/or "slope" methods, most of which would undoubtedly be preceded by investigations made by drilling core-testing, test-pits, churn-drills, etc.

Before starting any underground mining, it should be done only under the direct supervision of an experienced mining engineer. No work of this kind should even be started without a signed report or recommendation from such a person, stating the method to be used, location for sinking the shaft, proper areas for driving tunnels, etc. Such a report should be complete with assays, maps and drawings covering the entire project, location of ore-bodies along with an estimation as to size and extent comprising estimated tonnage, cost of operation, etc. Decision should also be made by this time as to whether milling will be done on the premises or transported to custom mills. If the latter such arrangements must have been made, showing anticipated transportation costs, milling costs, etc. to be incurred.

Since all such mines are subject to State Inspection, they must necessarily

be constructed and operated to comply with such regulations. The State Mine Inspector should be notified before starting operations.

Although not discussed up to this point, financing the entire project is no little or insignificant part of the program. If the individual is not able to finance the operation, it is then necessary to form an alliance or corporation between people sufficiently interested in the project to at least carry through the preliminary investigations, realizing that they will then be on the ground-floor if a rich find is in the offing. Such finances should be sufficient to carry the investigational work up to the point of starting to mine the ore, if found.

The second phase of the financial backing would then be required for such major expenditures necessary to set up necessary mining equipment, sinking shafts, driving tunnels, etc. At this phase of the program it would become necessary to employ one or more individuals experienced in handling such financial operations. Competent supervisors for the many over-all operations would have to be found, the group headed by an experienced mining engineer to act as general manager or superintendent. No doubt, the selling of stock would be the basis of such an adventure.

After the operation has been started and arrangements have been made for the milling and preparation of the ore for the market, as set up by the Atomic Energy Commission, there would be no question as to where the product would be sold as this Agency is the sole purchaser of all such materials produced within the U.S. For that reason there is no problem involved in "market expansion," other than from the standpoint of production.

As for a general outlook for the future, it appears as though one of the primary factors would be based upon the setting-up of a group of experienced prospectors whose duty it would be to look ahead for new fields for further investigation. A second or follow-up group, capable of evaluating these new-finds, would then report their findings to a Governing Board, making recommendations as to what directions should be followed if further mining expansions were contemplated for the future.

With such a program the organization could become quite extensive, assuming it to have been set-up under proper supervision and wise management.

N.B. No little credit is given to Mr. Helmer A. Walstrum's home study course entitled, "Prospecting for Minerals," for its auxiliary reference information.

(*Continued from page 202*)

GEMSTONES OF NORTH AMERICA. John Sinkankas. D. Van Nostrand Company, Inc. 1959. 704 pp. $15.

This large, heavy, and expensive volume primarily is a history of gem mining in the United States, and, to a lesser degree, in Canada, Mexico, and Central America. As such, it performs a distinct service by bringing up to date George F. Kunz's "Gems and Precious Stones of North America," published in 1892, which it resembles in arrangement and purpose.

Sinkankas, a navy captain stationed at present in Washington, is at his best in his authoritative description, from studies made while he was on duty at San Diego, of the celebrated tourmaline mines and deposits in nearby southern California. The book is well illustarted with 9 color plates from water color drawings and with text illustrations, including many of specimens from the National Museum.

R.P.M.

VIRGINIA CITY, NEVADA: History of the Comstock Lode Area. Edited by Sarah Ann Davis and Associates. PAGES OF HISTORY Publishing Company, Box 6, Sausalito, California. 1959. $1.50.

A unique guidebook to Virginia City and the Comstock Lode Area, designed as a "self-guided tour" of the lode itself. Profusely illustrated by numerous copies of out of print cuts, maps and diagrams from newspapers and magazines of the period of discovery, operation and exploitation of the entire "Lode Area," with elaborate quotes and comments.

Added is an elaborate tourist guide map, showing travel routes and features numbered to narrative and descriptive sketches to be found in the text, all planned to make your tour of the region both educational and enjoyable. The Guidebook also makes very interesting reading for those who can never really visit Virginia City in person, as well. We recommend it as a splendid historical documentation of the "Old West."

BULLETIN EDITOR'S BIBLE: "Suggestions to Authors of the Reports of the United States Geological Survey." This publication according to Domer Howard, Past President of the Rocky Mountain Federation, and present Editor of the "Sooner Rockologist," is a veritable gold mine of helpful information, designed to assist the author to achieve clarity of expression. "Every editor should have a copy on his desk as readily accessable as his dictionary," he says. It is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. Price $1.75 post paid.

* * * *

THE MISSISSIPPI RIVER IN GLACIAL TIMES: The title of two excellent articles published in the July Palimpsest, monthly magazine of the State Historical Society of Iowa, written by Dr. Arthur C. Trowbridge, former Director of the Iowa Geological Survey. The articles are well illustrated by pictures, maps and diagrams. Everyone interested in this chapter of the Midwest geology should have a copy of this issue of the Palimpsest in their library, as it is to the glaciers of the Pleistocene epoch that we are indebted for the wonderful agates which are so commen in the gravel beds skirting the Mississippi River valleys, past and present. While available, copies may be secured upon request, postpaid, by sending 25c to the office of the Society, at Iowa City, Iowa.

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Sworn to and subscribed before me this 9th day of September, 1959. Florence L. Brown (My commission expires February 6, 1963).

Notice to Advertisers

Our advertisers are respectfully advised that the advertising deadline for the next issue will be December 10th for all NEW ADS. Deadline for REPEAT ADS and for NEW PLATES submitted will be December 14th.

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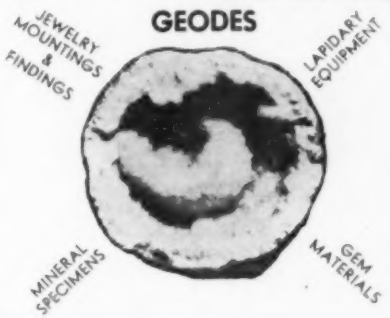

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